Impact of Faith-Based Interventions to Reduce Risk Factors that Lead to Increased Risk for Cardiovascular Disease among African Americans in the American South

By

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A Master's Paper submitted to the faculty of
the University of North Carolina at Chapel Hill
in partial fulfillment of the requirements for
the degree of Master of Public Health in
the Public Health Leadership Program

Chapel Hill

Spring 2015

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April 24, 2015

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4/17/2015

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Abstract

Background: Cardiovascular disease (CVD) has been the leading cause of death in the United States for more than 50 years, currently responsible for 48% of all deaths, and as a chronic disease, is among the most prevalent and preventable health problems facing our nation today. CVD can be effectively prevented through addressing behavioral risk factors like poor diet, physical inactivity, or obesity. The American South has been plagued with higher rates of CVD than other regions, and African Americans have the highest rates of CVD compared to other racial/ethnic groups. This paper describes the ability of faith-based interventions to impact and reduce CVD risk factors among African Americans living in the South.

Methods: Electronic databases (PubMed and the Cochrane Library) were searched for evaluation studies of faith-based interventions designed to address and reduce CVD risk factors among African Americans living in the American South. Within PubMed, the search algorithm was created to include the following elements: southern geographic location, CVD and its risk factors, religious/church affiliation, and the African American population. Within the Cochrane Library, the search term “church” was used to obtain relevant studies. Additional studies were located through reference from articles obtained through the primary database search. The following information was extracted from each article included in the review: the type of intervention, the geographic location(s) where it took place, the study design, the study population size and composition, the intervention components, the outcome(s) of interest, the quantifiable results, and the resulting conclusions.

Results: The initial search yielded 142 articles from PubMed and 152 articles from the Cochrane Library. After all articles were reviewed and any duplicates were ruled out, a total of 11 articles were selected for inclusion in the review. The studies included in this review proved to be very effective in that 3 of the 4 studies targeting weight loss, 7 of the 8 studies targeting increased physical activity, and 6 of the 7 studies targeting increased fruit and vegetable consumption were able to produce statistically significant results.

Conclusions: The African American church is shown to be rich in social capital and acts as a great support system for its members of all ages. It serves as a potentially effective and instrumental setting to provide health programming to parishioners because of the shared culture and religious beliefs along with the infrastructure to help allow for sustainability. With cardiovascular disease as the leading cause of death in the United States and a particularly high prevalence in the South, and African Americans as the racial population with the highest prevalence, the implementation of faith-based interventions to target cardiovascular disease in African Americans in the South is both timely and fitting.

I. Introduction:

Cardiovascular Diseases are a comprised of a group of disorders of the heart and blood vessels, and include coronary heart disease (CHD), cerebrovascular disease, peripheral artery disease, rheumatic heart disease, congenital heart disease, and deep vein thrombosis and pulmonary embolism (World Health Organization, n.d.).

Table 1. List and Definitions of Cardiovascular Diseases, as defined by the World Health Organization (WHO)

Coronary Heart Disease	Disease of the blood vessels supplying the heart muscle
Cerebrovascular Disease	Disease of the blood vessels supplying the brain
Peripheral Artery Disease	Disease of blood vessels supplying the arms and legs
Rheumatic Heart Disease	Damage to the heart muscle and heart valves from rheumatic fever, caused by streptococcal bacteria
Congenital Heart Disease	Malformations of heart structure existing at birth
Deep Vein Thrombosis and Pulmonary Embolism	Blood clots in the leg veins, which can dislodge and move to the heart and lungs

(World Health Organization, n.d.)

CVD has been recognized as the leading cause of death in the United States for more than 50 years (Cooper et al., 2000). The WHO notes, however, that the majority of CVDs are preventable through targeting behavioral risk factors like tobacco use, poor diet, physical inactivity, obesity, and excessive alcohol consumption, through population-wide intervention strategies (World Health Organization, n.d.).

High rates of risk factors like smoking, diabetes, and obesity associated with increased rates of stroke, coronary heart disease (CHD), and other cardiovascular complications, as seen in Table 3, along with physical inactivity rates among southern adults ranging from 23.0-35.2%, has, in part, led to the South being coined as the "Stroke Belt" due to (Liao, Greenlund, Croft, Keenan, & Giles, 2009; America's Health Rankings, 2014). The "Stroke Belt", as a region of the southeastern United States, was coined in 1965, having stroke mortality rates approximately 50% higher than that of other regions (G. Howard et al., 2007). The burden of chronic disease is felt most strongly by African-Americans, as they have the highest age-adjusted death rates of any race for heart disease, cancer, and diabetes, and higher incidence of both hypertension and obesity (Scott & Wilson, 2011). According to 2010 US Census data, the Black population has its highest concentration in the South. Fourteen percent of all people in the US identified as being black, and 55% of this population lives in the South (United States Census Bureau, 2011).

Ongoing research continues to suggest that social determinants of health play a key role in predicting health outcomes and are leading contributors to health disparities (Scott & Wilson, 2011). The World Health Organization (WHO) defines social determinants of health as being 'the conditions in which people are born, grow, live, work and age' (World Health Organization, 2013, p. 1), and can include factors like race, socioeconomic status, or geographic location. *Social capital* has been recognized as a significant social determinant of health, and refers to the collective value of social

relationships or social networks, and the respective reciprocity they are built upon. African American churches are seen to be noticeably rich in social capital, created by their system of strong support groups (Scott & Wilson, 2011).

In most African American communities, the church is considered the most important social institution; it is considered to be and instrumental organization in providing health programming to parishioners because members have a shared culture and shared religious values, along with infrastructures that help allow for sustainability (Barnes, 2009). This abundance of positive social capital and its link to health outcomes has led the majority of faith-based interventions for health purposes to be directed at the African American population (DeHaven, Hunter, Wilder, Walton, & Berry, 2004). The use of community-based approaches like faith-based interventions to address chronic disease risk factors is one of the key recommendations within Healthy People 2020 (Healthy People, 2011). The goal of this paper will be to evaluate the effectiveness of faith-based interventions to reduce some of the risk factors that lead to an increased risk for cardiovascular disease among African Americans in the South. The integration of social determinants of health is used to help evaluate the efficacy of interventions included in the review.

According to the CDC, African Americans (blacks) have the highest rates of death from major CVDs compared to other racial groups (Table 2). CVD mortality rates are especially high among black men compared to other race/sex groups, and CVD death rates are noticeably higher among men across all racial groups compared to their

female counterparts. Diabetes, another common CVD risk factor, disproportionately affects black populations, with a prevalence that is 1.8 times higher than that of non-Hispanic whites. Furthermore, blacks are more likely to also experience diabetes-related complications (Samuel-Hodge et al., 2009). Black adult males have higher smoking rates compared to white adult males (22.0% vs. 20.7%), and both black adult males and females have higher rates of obesity than white adults males and females (38.8% vs. 34.8% and 58.0% vs. 32.7%, respectively) (CDC, 2015).

Table 2. Age-adjusted death rates for major CVDs by race and sex in the United States, 2013

	Both Sexes	Male	Female
White	218.0	264.4	179.7
Black	284.1	345.3	238.6
American Indian / Alaska Native	157.5	187.4	131.3
Asian / Pacific Islander	133.5	162.2	111.4

Data are expressed as age-adjusted rates per 100,000 population; populations used for calculating death rates are estimates based on the 2010 census and estimated as of July 1, 2013 (CDC, 2015)

The foundational importance of the southern region in our nation's history has led to a regional distinctiveness that has remained a prolific and integral part of our culture and society as a whole. Sociologist John Shelton Reed, who has extensively studied the persistence of Southern subculture in American society, adds, "S*outherners* is not merely a descriptive label for a category which includes them, but the name of a group to which they feel they belong" (Savitt & Young, 1991, p. 2). While there exist many definitions of the South, the states most frequently included are Virginia, North Carolina,

South Carolina, Georgia, Florida, Tennessee, Mississippi, Alabama, Louisiana, and Arkansas (G. Howard, Labarthe, Hu, Yoon & V. Howard, 2007).

In the year 2010, of the top ten causes of death in the US, seven of them were chronic diseases; of the top two chronic conditions, cardiovascular disease and cancer, 48% of all deaths are attributable (CDC, 2014). Research has shown that today, many chronic diseases disproportionately affect individuals living in the American South compared to other regions of the country. The South contains four of the five states in categories with the highest number of cardiovascular deaths, and highest smoking, obesity, and diabetes rates (Table 3) (America's Health Rankings, 2014). Smoking, obesity, and diabetes are all among the top cardiovascular risk factors (World Heart Federation, n.d.).

Table 3. Lowest Ranked 5 States in the US for Cardiovascular Deaths, Smoking, Obesity, and Diabetes in 2013

Cardiovascular Deaths*	Smoking**	Obesity***	Diabetes†
Mississippi (346.0)	West Virginia (27.3)	West Virginia (35.1)	Alabama (13.8)
Alabama (329.2)	Kentucky (26.5)	Mississippi (35.1)	West Virginia (13.0)
Oklahoma (322.0)	Arkansas (25.9)	Arkansas (34.6)	Mississippi (12.9)
Arkansas (313.7)	Mississippi (24.8)	Tennessee (33.7)	South Carolina (12.5)
Louisiana (307.5)	Tennessee (24.3)	Kentucky (33.2)	Tennessee (12.2)

*Number of deaths per due to all cardiovascular diseases including heart disease and strokes per 100,000 population
**Percentage of adults who are current smokers
***Percentage of adults who are obese, with a body mass index (BMI) of 30.0 or higher
†Percentage of adults who responded yes to the question: "Have you ever been told by a doctor that you have diabetes?"
(America's Health Rankings, 2014)

According to the Centers for Disease Control and Prevention (CDC), “chronic diseases and conditions are among the most common, costly, and preventable of all health problems” (CDC, 2014, p. 1). Population-wide approaches that seek to address the causes rather than the complications of chronic disease are key to reducing risks throughout the entire population. The WHO notes that “fundamentally, interventions are required to address the underlying determinants of chronic disease.” These interventions must be designed to focus on both individuals who are at high risk and individuals who have established chronic disease. The outcomes of such interventions would reduce the risk for developing chronic disease in the future, reduce complications from existing chronic disease, and improve overall quality of life (World Health Organization, 2005, p. 90).

II. Methods

Focused Question

This systematic review seeks to answer the question, “What is the evidence that faith-based interventions can be effective in incorporating social determinants of health to reduce risk factors for cardiovascular disease in African Americans in the American South?” More specifically, the interest lies in determining what types of intervention strategies are most effective within the population of interest, and which risk factors can see the most significant improvements from the use of these strategies.

Several studies in the past have focused on the reduction of cardiovascular disease risk factors in African American populations, but fewer have focused on the regional differences or the targeted focus on the American South (Barnes, 2009). Research has shown that African American churches can be key organizations in providing health programs because of their trusted and steadfast infrastructure and shared culture and beliefs among members; most churches are believed to encourage and promote excitement about the future among their members (Barnes, 2009). There is evidence that faith-based health promotion programs have been able to produce significant changes among a variety of health behaviors. For the African American population in particular, health interventions that are able to incorporate both cultural and spiritual aspects have been the most effective (Campbell, Hudson, Reniscow, Blakeney, Paxton, et al., 2007).

Eligibility Criteria (Table 4)

For the purposes of this review, the included articles had to describe an intervention aimed at addressing and reducing cardiovascular risk factors among African Americans living in the American South. The locations covered by the American South for the purposes of this paper include Virginia, North Carolina, South Carolina, Georgia, Florida, Tennessee, Mississippi, Alabama, Louisiana, and Arkansas. The goal of this review is to determine the outcome of faith-based interventions on African Americans living in the South in order to determine the effectiveness of the intervention in reducing risk factors for cardiovascular disease. Through addressing risk factors for cardiovascular disease, outcomes in this review include decreases in weight or body

mass index (BMI), increases in physical activity, increases in the consumption of fruits and vegetables, or increases in diabetes-related quality of life. The interventions had to have taken place in a church setting or within faith groups among church members. Interventions that did not report outcomes and/or quantifiable results were excluded from this review. Furthermore, interventions that had only reported baseline results or pre-intervention status were also excluded. Articles were selected if the interventions reduced the rates for risk factors for cardiovascular disease and/or reduced cardiovascular disease rates.

Table 4. Eligibility Criteria

	Inclusion	Exclusion
Population	African Americans living in the American South	Non-African Americans in the South and all others living in other regions
Intervention	Faith-based	Non-faith-based
Outcome	Reduced rates for cardiovascular disease risk factors	Studies that do not directly address cardiovascular disease risk factors No effective reduction in cardiovascular disease risk factors No reported outcome Non-measureable results

Data Sources and Search Strategy

PubMed and the Cochrane Library were used to search for relevant studies and articles. Additional articles were retrieved through searching the references of articles obtained through the previous searches. Within the Cochrane Library, the search term “church” was used to obtain relevant studies; within PubMed, the following search algorithm was used:

(South*[tiab] OR Alabama[tw] OR Arkansas[tw] OR Florida[tw] OR Georgia[tw] OR Louisiana[tw] OR Mississippi[tw] OR North Carolina[tw] OR South Carolina[tw] OR Virginia[tw] OR Tennessee[tw]) AND (risk factor*[tw] OR cardiovascular[tw] OR blood pressure[tw] OR hypertension[tw] OR stroke[tw] OR heart[tw] OR diabetes[tw] OR tobacco[tw] OR nutrition[tw] OR physical activity[tw] OR physical inactivity[tw] OR obesity[tw] OR obese[tw] OR overweight[tw]) AND (faith-based[tw] OR faith[tw] OR church-based[tw] OR church[tw] OR religi*[tw]) AND (African American*[tw] OR black*[tw])

Relevant articles were first determined by reading the titles of articles resulting from the searches. If deemed eligible, the abstract was read, and from there, if it still could not be excluded, the article was read in its entirety.

III. Results:

The initial search yielded 147 articles from PubMed and 152 articles from the Cochrane Library. After all articles were reviewed and any duplicates were ruled out, 11 studies were included in the final review after meeting all inclusion criteria. Articles were excluded first if they were not intervention studies (n=142), and following, because they did not directly address cardiovascular disease risk (n=46), because no quantifiable outcomes were reported (n=23), because the intervention was either not in the South or not among African Americans (n=29), or because the sample size was too small (n=1).

Relevant articles were first determined by looking at the titles of articles resulting from the searches. Titles were deemed ineligible if they included disease factors other than CVD or its risk factors or if they directly noted populations other than African Americans in the American South as the population of interest. If there was no excluding criteria within the title alone, the abstract was read to determine if it would meet the inclusion criteria. Abstracts were excluded if they did not meet the aforementioned title inclusion criteria, if the study was not an intervention, if the intervention was not faith-based, if the intervention was either not yet carried out or reported past baseline, if the sample population was too small ($n<50$), or if the intervention could not produce quantifiable results. If the article could not be excluded after reading the abstract, the article was read in its entirety to determine final eligibility based on all inclusion and exclusion criteria.

Descriptions of the articles included are listed in Table 5. To address cardiovascular disease risk factors, four out of the eleven studies (36%) had a primary focus on weight loss and/or weight control, eight (73%) focused on increasing physical activity, and seven (64%) focused on enhancing nutritional intake through increased fruit and vegetable consumption. Interventions consisted of disseminating educational materials including cookbooks, informational videos, brochures, pamphlets, and other handouts, providing a forum for group and individual level counseling or instruction, provision of health checks, or any combination of these.

Table 5. Description of Studies Included in Final Review

Study Name	Author(s), Year	Location(s)	Study Design	*n*, Participant composition	Intervention	Outcome
The Faith, Activity, and Nutrition Program: a randomized controlled trial in African-American Churches	Wilcox, Parrott, Baruth, Laken, Condrasky, et al., 2013	74 African Methodist Episcopal (AME) churches in South Carolina	Randomized controlled trial	n=1257; majority of participants were female; mean age was 54	15-month intervention targeted each of the four structural factors: availability and accessibility, physical structures, social structures, and cultural and media messages	Significant increase in moderate to vigorous physical activity (MVPA) in the intervention group (p=.02); Further analysis showed an intervention effect for self-reported leisure time MVPA (p=.03) and self-reported fruit and vegetable consumption (p=.03). Intervention group reported a mean increase of 3.89 cups of fruits and vegetables per day. Changes in weight were not provided.
The WORD (Wholeness, Oneness, Righteousness, Deliverance): a faith-based weight-loss program utilizing a community-based participatory research approach	Kim, Linnan, Campbell, Brooks, Koenig, et al., 2006	3 rural African American churches in central North Carolina	Two-group, quasi-experimental, delayed intervention design	n=61; majority of participants were female; mean age was 54	8-week, behaviorally focused weight-loss program consisting of weekly modular educational meetings	The intervention group lost, on average, 3.0 more pounds compared to the control group (p=.001), and reported greater recreational physical activity from baseline to follow-up (p=.01). The mean weight change in the intervention group was -3.6 pounds; WORD leaders reported making changes in nutrition habits but significance was not discussed.

Short-term impact of a church-based approach to lifestyle change on cardiovascular risk in African Americans	Oexmann, Thomas, Taylor, O'Neil, Garvey, Lackland, & Egan, 1999	African American Christian community near Charleston, SC	Quasi-experimental design	n=133; majority of participants were female	10-week study including a baseline health assessment, eight educational sessions in a group setting, and a short-term health check using a community based participatory research approach	Significant short-term reductions in weight were noted, with a mean weight loss of 2.3 pounds in the intervention group (P<.01). Changes in nutrition or physical activity were not discussed.
Body and soul: A dietary intervention conducted through African-American churches	Reniscow, Campbell, Carr, McCarty, Wang, et al., 2004	15 African American churches	Cluster randomized effectiveness trial	n=1022; majority of participants were female; mean age was 50	6-month intervention operating at two levels- church wide events and environmental changes aimed at the entire congregation, and lay counseling delivered only to individuals enrolled in the study. The intervention utilized self-help educational materials and motivational interviewing	At post-test, participants in the intervention group reported significantly greater consumption of fruits and vegetables than those in the comparison group, with a mean increase of 1.4 servings per day (p<0.05). Changes in physical activity or weight were not discussed
The North Carolina Black Churches United for Better Health Project: intervention and process evaluation	Campbell, Motsinger, Ingram, Jewell, Makarushka, et al., 2000	49 churches from 10 rural eastern North Carolina counties	Randomized controlled trial	n=2519; majority of participants were female; similar participation was noted for all age groups 18+	4-year multicomponent intervention trial using personalized educational materials, activities to increase knowledge of and access to fruits and vegetables, and activities to increase social and environmental support for eating healthier	Significant correlations were found between fruit and vegetable consumption and both educational sessions/classes (p=.05) and printed materials (p=.02), with self-reported mean increase of 0.76 servings per day. Changes in physical activity or weight were not discussed.

A church-based diet and physical activity intervention for rural, lower Mississippi Delta African-American adults: Delta Body and Soul effectiveness study, 2010-2011	Tussing-Humphreys, Thompson, Mayo, & Edmund, 2013	Lower Mississippi Delta region	Quasi-experimental, randomized controlled design	n=403; majority of participants were female; mean age was 47	6-month multicomponent intervention consisting of educational sessions. One intervention was focused on physical activity. These was no use of motivational interviewing or peer counseling	Significant increases were seen in fruit and vegetable consumption with a self-reported mean increase of 0.9 servings per day. Significant changes in both self-reported aerobic (P=.02) and strength/flexibility (P=.03) physical activity outcomes were noted in the intervention group. Changes in weight were not discussed.
Diet Quality and Physical Activity Outcome Improvements Resulting From a Church-Based Diet and Supervised Physical Activity Intervention for Rural, Southern, African American Adults: Delta Body and Soul III	Thompson, Goodman, Tussing-Humphreys, 2015	Lower Mississippi Delta region	Quasi-experimental, randomized controlled design	n=409; majority of participants were female; mean age was 47	6-month multicomponent intervention consisting of educational sessions using trained research staff for motivational interviewing, a certified fitness instructor for the physical activity session and the supervised physical activity classes; educational presentations were presented by church liaisons	Of the intervention participants reporting changes in activity levels from baseline to post intervention, significantly more reported increased strength/flexibility physical activity (28%) as compared with decreased physical activity (12%), (P=.0131). Significant increases in the mean total fruit and vegetable intake, with a self-reported mean increase of 0.5 servings per day, was observed in the intervention group. Changes in weight were not discussed.
A randomized trial of a church-based diabetes self-management	Samuel-Hodge, Keyserling, Park,	24 African American churches in central North	Randomized controlled trial	n=201; 64% female, 36% male; mean age was 59	8-month intensive phase consisting of 1 individual counseling visit, 12 group sessions, monthly phone	Diabetes knowledge and diabetes related quality of life significantly improved in the intervention group compared

program for African Americans with type 2 diabetes	Johnston, Gizlice, et al., 2009	Carolina			contacts, and 3 encouragement postcards, followed by a 4-month reinforcement phase including monthly phone contacts	to the control (P=.003), and short-term metabolic control improved among study participants. Modest trends were noted following intervention for daily fruit consumption, with a self-reported mean increase of 0.2 servings per day (P=.07). There was little change in light or moderate physical activity. Changes in weight or were not discussed.
Results of go girls: a weight control program for overweight African-American adolescent females	Reniscow, Taylor, Baskin, & McCarty, 2005	Ten predominantly middle-socioeconomic African American churches in Atlanta	Two-group, quasi-experimental design	n=147; all participants were female; mean age was 14	6-month culturally tailored behavioral group physical activity intervention consisting of high-intensity (20 to 26 sessions) and moderate-intensity (six sessions) groups. In the high-intensity group, girls also received four to six telephone counseling calls	There was a net difference of 1.8 pounds favoring the high-intensity group, although non-significant. High attenders lost an average of 1.3 pounds while low attenders gained 3.7 pounds, borderline significance (p=.07). Changes in nutrition were not discussed.
A pilot church-based weight loss program for African-American adults using church members as health educators: a comparison of	Kennedy, Paeratakul, Champagne, Ryan, Harsha, et al., 2005	An African American church in Baton Rouge, Louisiana	Randomized trial design without a control group	n=40; mean age was 44	6-month weight loss intervention; the group intervention consisted of nutrition education delivered in six monthly group meetings with group discussion. The individual intervention consisted of similar	After six months, a modest but significant mean weight loss of 7.3 pounds was seen in all participants (P<.05). The mean weight losses in the individual and group interventions were 7.5 pounds and 6.8 pounds, respectively. Approximately

individual and group intervention					nutrition education delivered in 15 individual meetings, record keeping, and basic dietary assessment. An increase in physical activity was emphasized in both intervention groups	83% of participants reported an increase in both leisure time and sport activity, with decreases in physical inactivity and television viewing. Changes in nutrition were not discussed.
Results of the healthy body healthy spirit trial	Reniscow, Jackson, Blissett, Wang, McCarty, et al., 2005	16 socioeconomically diverse black churches in the Atlanta area	Three-group, quasi-experimental design	n=1056; majority of participants were female; mean age was 46	1-year multicomponent intervention consisting of three intervention groups. Group 1 received standard educational materials, Group 2 received culturally targeted self-help nutrition and physical activity materials, and Group 3 received the same intervention as did Group 2 as well as 4 telephone counseling calls based on motivational interviewing delivered over the course of 1 year	The percentage making any change (in fruit and vegetable consumption or in physical activity) was greatest in Group 3 (70.0%). In this group, the percentage making only a single change was similar to the full sample population, 69.0%. However, 23.0% made a large change in both physical activity and fruit and vegetable consumption, with a self-reported mean increase of 1.13 servings per day. Changes in weight were not discussed.

Wilcox, Parrott, Baruth, Laken, Condrasky, et al. (2013) evaluated intervention churches that implemented physical activity and healthy eating activities that targeted each of the four structural factors: availability and accessibility, physical structures, social structures, and cultural and media messages through distributing bulletin inserts, sharing messages from the pulpit, passing out educational materials, creating a Faith, Activity, and Nutrition (FAN) Program bulletin board, and suggesting physical activity and healthy eating policy/practices. Community based participatory research approach guided intervention development. A significant increase in moderate to vigorous physical activity (MVPA) in the intervention group (p=.02) was reported and further analysis showed an intervention effect for self-reported leisure time MVPA (p=.03) and self-reported fruit and vegetable consumption (p=.03). The intervention group reported a mean increase of 3.89 cups of fruits and vegetables per day. Changes in weight were not provided.

Kim, Linnan, Campbell, Brooks, Koenig, et al. (2006) evaluated an intervention in which participants met once a week for 2 hours in WORD (wholeness, oneness, righteousness, deliverance) groups (8 to 10 people) groups led by a pair of trained community members known as WORD Leaders (or lay health leaders). WORD Leaders were members of a participating church and were assigned to facilitate WORD groups that consisted of participants from their respective churches. Group meetings consisted of measurements, review of previous topics, physical activity through the use of an exercise tape, a Bible study with a health message, and prayer. The intervention group lost, on average, 3.0 (0.87) more pounds compared to the control group (p=.001). After

controlling for baseline body mass index, education, and age, the magnitude of difference between the treatment group and the control group's mean weight loss decreased, but the results remained highly significant (p=.003). The mean weight change in the intervention group was -3.6 pounds. WORD leaders reported making changes in nutrition habits but significance was not discussed.

Oexmann, Thomas, Taylor, O'Neil, Garvey, Lackland, & Egan (1999) utilized a community based participatory research approach in their "Lighten Up" intervention to encourage lifestyle changes for improving cardiovascular risk through eight educational sessions in a group setting, combining scripture and health messages, along with short-term and long-term health checks. Significant short-term reductions in weight were noted, with a mean weight loss of 2.3 pounds in the intervention group (P<.01). Changes in nutrition or physical activity were not discussed.

Reniscow, Campbell, Carr, McCarty, Wang, et al. (2004) designed an Intervention constructed from essential components of two successful research-based interventions. They utilized church-wide nutrition activities and events such as their kick-off event/health fair. Self-help materials provided included a cookbook and an informational video, and lay church members trained by project staff performed motivational interviewing. At post-test, participants in the intervention group reported significantly greater consumption of fruits and vegetables than those in the comparison group, with a mean increase of 1.4 servings per day (p<0.05). The intervention group showed a small, but significantly greater decrease for percentage of calories from fat, and increases for

intrinsic and extrinsic motivation to eat fruits and vegetables, self-efficacy to eat fruits and vegetables, and social support to eat more fruits and vegetables ($p<0.05$). Changes in physical activity or weight were not discussed

Campbell, Motsinger, Ingram, Jewell, Makarushka, et al. (2000) used church members who were trained as lay health advisors, to encourage pastors to support the project "from the pulpit" via sermons and announcements, and to form county coalitions containing church members, local agency representatives, grocers, and farmers to help with the dissemination of personalized self-help bulletins, group activities to increase access to fruits and vegetables, and education in preparing them. The personalized bulletins contained tailored feedback based on baseline survey info regarding fruit and vegetable consumption, stages of change, barriers, beliefs, and social support, and were mailed to each church member's home. Monthly packets of materials were also mailed to each intervention church. Activities were planned to increase access to fruits and vegetables, to provide education and skills in preparing them, and to help overcome barriers to consumption. Significant correlations were found between fruit and vegetable consumption and both attendance of educational sessions/classes ($p=.05$) and acquisition of printed materials ($p=.02$), with self-reported mean increase of 0.76 servings per day. More frequent church attendance during the study was strongly correlated to an increase in fruit and vegetable consumption among the intervention participants. Changes in physical activity or weight were not discussed.

Tussing-Humphreys, Thompson, Mayo, & Edmund (2013) utilized research staff to develop educational sessions and provide technical assistance throughout the program without the use of direct peer counseling or motivational interviewing. The intervention was adapted from the National Cancer Institute and American Cancer Society sponsored Body and Soul program. The education sessions were presented collaboratively with a trained church committee member and focused on the increased consumption of health foods, appropriate portion sizes, and the resulting health impacts, while one intervention focused on physical activity. Intervention participants received monthly newsletters containing nutrition and physical activity topics, healthy recipes, and testimonials from fellow church members about making diet and physical activity changes. Participants in the control churches received bimonthly newsletters containing information about colds and flu, food safety, and reducing stress. Significant increases in the mean fruit and vegetable consumption, with a self-reported mean increase of 0.9 servings per day in the intervention group. Significant changes in both self-reported aerobic (P=.02) and strength/flexibility (P=.03) physical activity outcomes were noted in the intervention group. Changes in weight were not discussed.

Thompson, Goodman, & Tussing-Humphreys (2015), within an updated version of the previous intervention, continued the use of research staff to develop education sessions emphasizing increased consumption of healthy foods, appropriate portion sizes, and health impacts, but added in 3 additional sessions to the length of the intervention, provided formal aerobic strength and activity classes supervised by a certified fitness instructor, and provided up to 2 telephone calls for motivational interviewing by trained

research staff. Of the intervention participants reporting changes in activity levels from baseline to post intervention, significantly more reported increased strength/flexibility physical activity (28%) as compared with decreased physical activity (12%), (P=.0131). Significant increases in the mean total fruit and vegetable intake, with a self-reported mean increase of 0.5 servings per day, was observed in the intervention group. Changes in weight were not discussed.

Samuel-Hodge, Keyserling, Park, Johnston, Gizlice, et al. (2009) utilized research staff to conduct individual counseling sessions for study participants, group education sessions, monthly phone calls, and the mailing of encouragement postcards to promote diabetes self-management, while the control group received only educational pamphlets via mail. Following the intervention lasting one year in total, diabetes knowledge and diabetes related quality of life significantly improved in the intervention group compared to the control (P=.003), and short-term metabolic control improved among study participants. Modest trends were noted following the intervention for daily fruit consumption, with a self-reported mean increase of 0.2 servings per day (P=.07). There was little change in light or moderate physical activity. Changes in weight or were not discussed.

Reniscow, Taylor, Baskin, & McCarty (2005) utilized trained research staff to deliver a culturally tailored behavioral group intervention of either high-intensity or moderate-intensity physical activity to adolescent females for weight loss purposes. Each session included an experiential behavioral activity, ~30 minutes of physical activity, and

preparation and tasting of healthy foods. Those in the high-intensity group also received telephone-counseling calls from trained research staff. At 6-month follow-up, the net difference between the high- and moderate-intensity groups was 0.5 BMI units, although this difference was not statistically significant (p=.20). Girls in the high-intensity PA group, however, who attended more than three-quarters of the sessions, had significantly lower body mass index (p=.01) and percentage body fat (p=.01) relative to girls in the high-intensity group who attended fewer sessions. There was a net difference of 1.8 pounds favoring the high-intensity group, although the result was non-significant. High attenders lost an average of 1.3 pounds while low attenders gained 3.7 pounds, having borderline significance (p=.07). Changes in nutrition were not discussed.

Kennedy, Paeratakul, Champagne, Ryan, Harsha, et al. (2005) utilized research professionals to deliver nutrition education in group sessions for one group and individual nutrition education along with food diary record keeping (a seven day food diary each month) and a basic dietary assessment using a commercial nutrition computer software program for the other group to promote weight loss. Physical activity was emphasized in both groups. After six months, a modest but significant mean weight loss of 7.3 pounds was seen in all participants (P<.05). All participants saw a significant decrease in body weight, body mass index, body fat mass, and fat free mass. The mean weight losses in the individual and group interventions were 7.5 pounds and 6.8 pounds, respectively. Approximately 83% of participants reported an increase in both

leisure time and sport activity, with decreases in physical inactivity and television viewing. Changes in nutrition were not discussed.

Reniscow, Jackson, Blissett, Wang, McCarty, et al. (2005) utilized research staff conduct interventions in 3 groups. Group 1 received standard educational materials, Group 2 received culturally targeted self-help nutrition and physical activity materials, and Group 3 received the same intervention as Group 2, as well as 4 telephone counseling calls based on motivational interviewing. The percentage making any change was greatest in Group 3 (70.0%). In this group, the percentage making only a single change was similar to the full sample population, 69.0%. However, 23.0% made a large change in both physical activity and fruit and vegetable consumption, with a self-reported mean increase of 1.13 servings per day. Individuals in groups 2 or 3 who used the cookbook and watched the nutrition video had significantly greater fruit and vegetable intake than others. Individuals who reported using the activity guide had a significantly greater increase in physical activity than those not using the guide. Changes in weight were not discussed.

Of the 4 studies addressing weight loss, 3 demonstrated successful, significant ($p<.05$) weight loss by participants over intervention periods ranging from 8 weeks to 6 months, in the range of 2.3 to 7.3 pounds. Of the 8 studies addressing physical activity, 7 demonstrated successful, significant ($p<.05$) increases over intervention periods ranging from 8 weeks to 15 months, in the context of increased high intensity physical activity, moderate to vigorous physical activity (MVPA), recreational or leisure time physical activity, and aerobic and strength/flexibility physical activity. Of the 7 studies addressing

nutrition, 6 demonstrated successful, significant ($p<.05$) increases in the mean self-reported, daily fruit and vegetable intake by participants over intervention periods ranging from 6 months to 4 years, in the range of 0.5 to 3.89 servings of fruits and vegetables per day.

IV. Discussion:

This systematic review includes twelve interventions investigating their impact on the ability to effectively reduce risk factors for cardiovascular disease through faith-based approaches among the African American population living in the American South. The review includes a variety of effective intervention approaches including disseminating educational materials such as cookbooks, informational videos, brochures, pamphlets, and other handouts, providing a forum for group and individual level counseling or instruction, provision of health checks, or any combination of these.

Cardiovascular disease is the leading cause of death in the United States and the highest prevalence is seen in the South and among African Americans. With the African American church serving as the most important social institution within this population, it is important to examine the effectiveness of interventions within. Many of the cardiovascular disease risk intervention programs reviewed utilized some from of behavioral modification designed to reduce unhealthy behaviors and increase healthy behaviors by supplementing education of cardiovascular disease and its risk factors

with intervention components to lose weight, increase physical activity, and increase fruit and vegetable consumption.

The study designs differed, including 3 randomized controlled trials, 6 quasi-experimental designs, 1 cluster randomized effectiveness trial, and 1 randomized trial without a control. All of the studies reviewed used multi-component interventions, therefore it is not clear which intervention component is most effective. Furthermore, several studies used an ecological framework and focused on environmental changes such as health-minded bulletin boards within churches or church-wide health fairs, but the effects varied particularly among different-sized churches. Campbell, Motsinger, Ingram, Jewell, Makarushka, et al. (2007) noted in their study that members of smaller churches had a greater perceived impact of intervention components compared to members of larger churches, possibly due to either the more close-knit nature, consisting of extended family groups, of small churches in the South, or the likelihood that smaller churches had fewer competing programs or commitments. Scott and Wilson (2011) noted that there is increasing use of ecological theory when performing public health research and interventions, as it utilizes a multilevel, multicomponent view, and reinforces the ideal that health is “contingent” on interacting elements (p. 2). Most studies in the review did produce statistically significant results from the interventions; 3 of the 4 studies targeting weight loss, 7 of the 8 studies targeting increased physical activity, and 6 of the 7 studies targeting increased fruit and vegetable consumption were able to produce statistically significant results.

Difficulties encountered while synthesizing study data included different outcomes, different measures, and different intervention timelines. The studies consisted of different outcomes in that they each did not address all three primary outcomes of weight loss, increased physical activity, and increased fruit and vegetable consumption. Different measures encountered while synthesizing studies were most pronounced across the measure of physical activity; there was not a standard measure used across all studies and the various measures consisted of high intensity physical activity, moderate to vigorous physical activity (MVPA), recreational or leisure time physical activity, and aerobic and strength/flexibility physical activity. For the weight loss measure, one study (Kennedy, Paeratakul, Champagne, Ryan, Harsha, et al., 2005) used the metric system (kilograms) for measuring weight loss, so the results had to be converted to imperial units (pounds) in accordance with the other studies. Different intervention timelines existed across the studies in that they ranged anywhere from 8 weeks to 4 years. The majority (7 interventions) lasted between 6 months and 1 year. The length of time over the course of intervention for the outliers had to be taken into account when evaluating the results.

The review, however, does have some limitations. First, all of the studies included have a female population majority, so we are unable to discern the extent of impact such interventions may have on the male population; African American males have the greatest risk for cardiovascular disease compared to their female counterparts. Overrepresentation of women in African American church populations reflects on the low percentage of active male church members (Tussing-Humphreys, Thompson,

Mayo, & Edmund, 2013). Secondly, the studies have wide variations in study population size. Several studies contain sample sizes that are relatively smaller than the others, making the results of these less generalizable to the overall population. According to the law of large numbers, as the sample size increases, the sample mean will converge to the true population mean (The Law of Large Numbers, n.d.). Finally, the concept of faith-based interventions is rather new and the knowledge base is still building around it. Because of this, this is not much information on the ability to provide long-term or lasting effects from these interventions. Because the African American church is such a staple in southern black culture, and because the church provides a stable and consistent method of support for this population, the outlook for maintenance is bright, but there is currently not the literature to back up this notion.

V. Conclusions & Recommendations

Churches play a vital role in many rural communities, and in many African American communities, the church is considered to be the most important social institution (Barnes, 2009). It serves as a potentially effective and instrumental setting to provide health programming to parishioners because of the shared culture and religious beliefs along with the infrastructure to help allow for sustainability (Barnes, 2009; Tussing-Humphreys, Thompson, Mayo, & Edmund, 2013). With cardiovascular disease as the leading cause of death in the United States and a particularly high prevalence in the South, and African Americans as the racial population with the highest prevalence, the

implementation of faith-based interventions to target cardiovascular disease in African Americans in the South is both timely and fitting.

The majority of interventions carried out to reduce cardiovascular disease risk factors among this population targeted the primary outcomes of weight loss, increased physical activity, and increased fruit and vegetable consumption. The studies included in this review proved to be very effective in that 3 of the 4 studies targeting weight loss, 7 of the 8 studies targeting increased physical activity, and 6 of the 7 studies targeting increased fruit and vegetable consumption were able to produce statistically significant results. The use of social determinants of health like race, geographic location, and religion, should be used to inform the creation and evolution of public health interventions in order to reduce the risk for developing chronic disease in the future, reduce complications from existing chronic disease, and improve overall quality of life, in accordance with a key recommendation within Healthy People 2020 to use community-based approaches like faith-based interventions to address chronic disease risk factors (World Health Organization, 2005, p. 90; Healthy People, 2011). Moving forward with designing similar interventions for future implementation is appropriate and feasible given the successful and effective outcomes of the studies included in this review.

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